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The lowest glacier Col. Tanner has seen in the Himalayas is one that reaches the foot of the range near Chaprot Fort in latitude  $35\frac{1}{2}^{\circ}$ , in Gilgit. It is formed of beautiful clear ice, and has no dirt. In Kulu and Labaul (latitude  $32^{\circ}$ ) glaciers do not come down below 12,000 or 13,000 feet, and all are very dirty; and in Sikkim (latitude  $28^{\circ}$  or  $29^{\circ}$ ), without having visited the glacier region himself, Col. Tanner would say that the lowest limit reached by the Kinchinjanga group must be considerably higher, perhaps by 2,000 feet or even more. The smallest mountain he has ever met with, capable of giving rise to a glacier, is one on the Gilgit-Dareyl range, whose height is 17,000 feet; and in this case the mass of ice formed is of very inconsiderable size. Of the glaciers round Mount Everest and its great neighbors, we know next to nothing; and the little we have learned is derived from the itineraries of native explorers, who, of all classes of travellers, seem the least capable of furnishing trustworthy information regarding any subject lying at all outside their actual angular and distance measurements. But with his telescope, when employed on the survey of the Nipal boundary, Col. Tanner has gazed long and earnestly at the icy regions at the foot of Everest, and Peak No. XIII., where the glaciers extend over a very large area.

With regard to our actual knowledge of the Himalayas, Col. Tanner thinks that perhaps our botanical knowledge is far ahead of other branches of science. Many eminent botanists have been at work for a long time past, and of late Dr. Duthie has been allowed to travel on duty into tracts not before visited by any one possessing the requisite knowledge. It is likely that Dr. Duthie's museum at Saharunpur will, within a moderately short time, become an almost complete depository of the chief vegetable products of the Himalayas. The geologists, Messrs. Blandford, Edwin Austen, Richard Strachey, Stolitza, and Lydekker, have been pretty well over those tracts open to Europeans, and are now well acquainted with all the leading features of their branch of science presented by the mountains of Kashmir, Kumaon, Kangra, and Sikkim. Ornithology has found many votaries, and the birds of these mountains are now probably all or nearly all known, though the late Capt. Harman, only a few years back, discovered a new and handsome pheasant in the extreme eastern end, either of Bhutan or Thibet. The mammals, Col. Tanner supposes, are all known, though one, at least, the Shao, or great stag of Thibet, has not even been seen by any European, and the famous *Ovis poli* has been shot by not more than two or three sportsmen.

With regard to the work of the survey, Col. Tanner stated that the maps of Kashmir and Gilgit, without being free from error, are of the greatest use to a large class of officials. Incomplete though they may be, they were not brought up to their present state without taxing to the utmost the endurance of a hardy set of men. Adjoining Kashmir to the eastward comes Kangra, with its subdivisions of Kulu, Lahaul, and Spiti. Kangra had once been roughly surveyed prior to the arrival there of Col. Tanner's party, who are now at work on a very elaborate contoured map, which will take a long time to complete, owing to the intricacy of the detail demanded. Between Kangra and Kumaon occur various native states whose territories are being surveyed on the scale of two inches to one mile, also contoured work, resulting in very elaborate and trustworthy, though somewhat expensive, maps. Eastward of Kumaon, Nipal stretches along our border for some five hundred miles till Sikkim is reached; and eastward again of Sikkim comes Bhutan, and various little-known and semi-independent states which lie on the right bank of the Sanpo River. Nipal marches with the Kumaon border for many miles, and advantage was taken of the existence of the trigonometrical stations on the Kumaon hills to extend our knowledge of the adjacent topography of Nipal, and this was done about four years ago with some little result. The more prominent peaks in Nipal within a distance of about one hundred and sixty miles were fixed trigonometrically, and some slight topographical sketching was done. From the trigonometrical stations near the foot of the lower hills, both in the North-West Provinces and in Bengal, trigonometrical points have lately been fixed, and some distant sketching done in Nipal, for five hundred miles between Kumaon on the western, and Sikkim on the eastern, extremity of this kingdom; and, again, from the trigonometrical hill stations

along the western boundary of Sikkim more points and hazy topography of Nipal was secured. This very meagre topography, sketched from very great distances, comprises all the geography of Nipal other than the sparse work collected by Col. Montgomerie's explorers, or by explorers trained to his system who have worked since his death. All the existing data, whether trigonometrical, distant sketching, or native explorers' routes, are now being combined, as far as the often conflicting and contradictory materials admit. The resulting map of the country, though at most little better than none, is all we have to expect until some of the strictures on travelling in Nipal are lessened by the Nipal Government.

The whole of the Nipalese border, which marches with British territory for some eight hundred miles, is jealously guarded, and no European is allowed to cross it, except when the Resident of Kashmir, or his own personal friends, are permitted to proceed by a certain and particular route, between the military station of Segowli and Katmandu. Sikkim flanks the eastern boundary of Nipal, and the, until lately, indefinite western boundary of Shutan. British Sikkim is a small tract, which has twice been surveyed on suitably large scales. Independent Sikkim, which contains Kinchinjangee, one of the highest mountains, and some famous passes, — the Donkhya, visited by Sir Joseph Hooker and a few others; and the Jelap, where our forces, under Gen. Graham, have lately been employed, — was surveyed in reconnaissance style by Mr. Robert, an energetic and hardy assistant of the Survey of India Department. The sketch-map obtained by this gentleman is complete, and similar in character to that of Gilgit by Col. Tanner, and to that of Nari Khorsam and Hundes by Mr. Ryall. It does not pretend to any exhaustive detail.

Our knowledge of Bhutan, or, rather, our ignorance of it, is about on a par with that of Nipal; but in Bhutan we have the valuable information left by Capt. Pemberton, who forty-three years ago traversed the greater portion of the country from west to east. Besides Pemberton's work, Col. Godwin-Austen, while he accompanied Sir Ashley Eden's mission to the court of the Deb Raja in the year 1863, executed a route-survey in western Bhutan. The engineer officers who were attached to the military force at Pewangiri also did some little topographical sketching; and beyond this we have distant sketching and trigonometrical work, as in Nipal, which also has yet to be combined with the route-surveys of native explorers, some rather recent, and some of greater date. The difficulties which are presented to further researches in the direction of Bhutan geography seem unlikely to diminish. Our knowledge, then, of Bhutan is as unsatisfactory as that of Nipal. Eastward of Bhutan occur those numerous semi-independent hill-states which sometimes, when necessity presses, own allegiance to Thibet, and at others assert their complete freedom from control. Col. Tanner himself has sent in two maps of this region derived from native sources, and both upset maps previously accepted, and it is highly improbable that we have any but the most rudimentary and vague knowledge of the course of the Sanpo below Gyala Sindong, and not even that of the course or limits drained by the Dibong. Col. Tanner then referred in some detail to the great rivers that have their sources in the Himalayas, and concluded by giving some advice to tourists as to the best routes to take.

#### BANANA PRODUCTION.

THE banana industry, which, according to the "Handbook of the American Republics," was only commenced in 1883, is becoming more and more important every day. The bananas, which grow spontaneously in the tropical countries, have been from that date an article of commerce. Formerly they were planted in the coffee plantations to shade the young trees and shelter the grains from the wind that would sweep down the unmaturing berry. The fruit of the banana was used to fatten pigs, or grew without any cultivation in the mountains and plains, thus going to absolute waste. Bananas principally come from the British West Indies, Cuba, Honduras, Costa Rica, Nicaragua, Guatemala, British Honduras, Colombia, Hawaiian Islands, and Salvador.

The lands chosen for the production of the bananas are those

that contain extensive alluvial deposits, composed chiefly of blue clay impregnated with marine salt, and rich in decomposed vegetable matter. On large plantations the trees are usually planted from twelve to fifteen feet apart, in the form of squares, and where irrigation is required, trenches are dug between them to admit the water passing through as often as it is necessary. In places where the rain is abundant, or where the soil is damp, the bananas grow best. It is generally at the end of nine months that the plants mature, and after that time the fruit can be gathered every week in the year, provided the plantation has been well kept, and has had a good start. At that time the trunk of the tree attains a height of eight or ten feet, and a girth of about thirty-six inches. From the trunk, which is porous and yields an excellent fibre, palm-like branches are thrown out to the number of six or seven. The bunch of fruit appears at the juncture of the trunk and branches, and consists of from four to twelve of what are termed "hands," each hand having eight to twelve bananas on it. A bunch of eight hands or clusters is counted as a full bunch; while those that have from five to seven are taken as a half bunch; bunches not less than five hands are styled third class, the others respectively first and second class. From the root of this tree several shoots or suckers sprout, each of which in turn becomes a tree, and bears a bunch of bananas, or they may be transplanted. After a bunch has been cut, the tree is usually felled; in fact, the tree is more frequently cut to gather the fruit. The manner in which the banana is cultivated is most easy, as very little skill or labor is demanded, nature doing almost all the work.

#### LETTERS TO THE EDITOR.

*\*\* Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

*The editor will be glad to publish any queries consonant with the character of the journal.*

*On request, twenty copies of the number containing his communication will be furnished free to any correspondent.*

#### Origin of the Galapagos Rookeries.

It is generally supposed that animals now living in latitudes bordering the polar circles are naturally confined to the cool regions of the earth, and such is usually the case; but there are some remarkable exceptions to this rule. Such, for instance, are the rookeries of albatross, fur seal, and penguin at the Galapagos Islands.

That this equatorial group of islands is inhabited by a fauna usually confined to the high latitudes has long been known to Pacific navigators, and also to such celebrated naturalists as Darwin and Agassiz, who visited them years ago. Still, there seems to be no satisfactory explanation offered to show why the fauna of the cold latitudes should now exist at the equator.

It may be that neither of the above naturalists, while having knowledge of the rookeries of hair seal, knew that a small rookery of fur seal made its home under the almost inaccessible cliffs of Abingdon, or that albatrosses had their hatching place on the shores of Hood's Island, or that a small species of penguin frequented the shores of Albemarle.

Under the present climatic conditions of our globe, it is not likely that the fauna of the cold regions would have selected breeding places under the equator, especially when such rookeries are so far removed from their normal home in the high latitudes. As their inhabitants are never seen far from the land of birth, I for many years after my first visit to these islands was unable to supply myself with a satisfactory solution of the problem. I at first thought that the albatrosses may have made the passage from their tropical rookery to the high latitudes through the upper atmosphere, which their great power of flight would enable them to accomplish. But I have since come to the conclusion that the Galapagos rookeries are the relics of a frigid period, and that their progenitors sought out these seemingly unnatural breeding places at a time when the climate of the Galapagos was much colder than now.

When we consider the low temperature which the eastern Pacific waters must have possessed during the ice-age, when the lands of southern Chili, and the shores of North America as far south as Oregon, were launching icebergs into the sea to be floated

directly towards the Galapagos by the prevailing ocean currents, we can conceive how during such a frigid age the fauna of the high latitudes found a fitting home within this portion of the tropics. And it is owing to the ocean currents which still move from the high latitudes along the North and South American coasts, and cool the Galapagos seas, and also to the strong attachment of such species of life for their breeding places, that they have been able to continue, a feeble remnant, until the present century. Moreover, the isolated situation of the Galapagos may have aided, at the close of the ice period, to prevent the abandonment of the rookeries for a more congenial latitude. The nearest lands now suitable and occupied by such species of animals, as before stated, are situated in the high latitudes, thousands of miles distant from the Galapagos, while the wide intervening seas afford no signs of the albatross, seal, or penguin; and it is the opinion of seamen who are acquainted with the Galapagos rookeries that their occupants are confined to the seas of that region.

The rookeries of sea-lions found on these islands, and so well described by Mrs. Agassiz, are also far removed from the usual breeding places of such animals, the sea-lions of California being their nearest neighbors.

The large tortoises which inhabit the Galapagos, and from which the islands derive their name, probably emigrated at an early date from the American coast, which is some four hundred miles distant; for I have noticed that they appear quite at home in the water.

The progenitors of the terrestrial iguanas found on Albemarle, probably lived in the ocean in the remote past, according to Darwin's opinion, and are consequently related to the sea iguanas which abound in those waters.

C. A. M. TABER.

Wakefield, Mass., May 16.

#### BOOK-REVIEWS.

*A Journal of American Ethnology and Archæology.* Edited by J. WALTER FEWKES. Vol. I. Boston and New York, Houghton, Mifflin, & Co., 1891.

*Report of the Proceedings of the Numismatic and Antiquarian Society of Philadelphia for the Years 1887-1889.* Philadelphia, printed for the society, 1891.

THE *Journal of American Ethnology* is scarcely such in the usual acceptance of the term. Its whole contents consist of three papers by the editor, all of them from his notes when connected with the Hemenway South-western Archæological Expedition. The first is entitled "A Few Summer Ceremonials at Zúñi Pueblo," principally descriptive of various dances. The second is on "Zúñi Melodies," the notes of which were obtained by Dr. Fewkes on phonographic cylinders exposed to the singing of various members of the Zúñi tribe, and subsequently taken down from the hearing with the aid of a harmonium. The instrumental study of the melodies is the work of Mr. Benjamin Ives Gilman, and is admirably presented. The third paper, accompanied with a map, describes a "Reconnaissance of Ruins at or Near the Zúñi Reservation." These ruins are those of the former residences of the Zúñi tribe, and are eighteen in number, though the reconnaissance is not asserted to embrace all that remain.

The *Journal* is admirably printed, well-illustrated, and full of excellent original material, although its title seems a misnomer.

The volume of proceedings of the Numismatic and Antiquarian Society of Philadelphia, edited by its efficient secretary, Mr. Stewart Culin, contains the usual lists, etc., and seven original papers, of all of which we can speak in terms of praise. One is by Mr. Culin himself, on a curious secret society among the Chinese in America, and two are by the Rev. Dr. W. M. Beauchamp, on the Onondagas and the early medals, crosses, rings, etc., found among them. Mr. B. S. Lyman, a high authority on all Japanese matters, describes an old Japanese standard foot measure; Mr. Frances Jordan, jun., speaks of aboriginal American wood-working; and the president of the society, Dr. Daniel G. Brinton, contributes a study of the character of American aboriginal poetry, and also an interpretation of a celebrated rock-inscription near Orizaba, Mexico, called "The Stone